

Simulation of "time-based" versus "sensor-based" traffic light system

ABSTRACT

Simulation of time-based and sensor-based traffic light control system at four-way intersection using Arena simulation software was studied. Introduction of sensors in traffic light system has been developed to reduce waiting time of vehicles at intersection. Simulation with Arena is done to observe if the improvement of sensor-based system is significant over the current system (fixed-time) and to evaluate the effects of implementing sensor-based system in busy and normal road condition. Algorithm of traffic light sequence is done first prior to development of simulation. Then, the simulation of traffic light system is developed for both normal and busy traffic condition and the data obtained is analyzed using statistical process control. From the result, average waiting time for sensor-based system was 62.5% less than time-based system for each vehicle in the normal traffic condition, and 15% less for busy traffic condition. This shows significant improvement based on the paired T-test done.

Keyword: Traffic light control system; Arena; Simulation modeling